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| 10/616,200 | 07/09/2003 | Paul Lawheed | 8639 | 9690 |

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06/08/2005

Mr. Lynn G. Foster
602 E. 300 S.
Salt Lake City, UT 84102

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| EXAMINER |
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DIAMOND, ALAN D

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| ART UNIT | PAPER NUMBER |
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1753

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,200

Applicant(s)

LAWHEED, PAUL

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>08262003</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference sign 60 which is in Figures 5, 6, 7, and 8. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "62" has been used to designate side rails, a sunlight deflecting section, a frame, and a deflection frame (see page 11, lines 7-13 and 20, and page 12, line 4, of the specification). It is not clear what reference sign 62 is referring to, and it is requested that Applicant use consistent terminology to describe reference sign 62. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

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replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: On page 1, at the continuity data, Applicant should insert the patent numbers for serial Nos. 10/458,917 and 10/251,709. Appropriate correction is required.

Suggested Claim Language

4. It is suggested that the word "and" be inserted at each of the following locations: In claim 1, at line 3, after the term "from sunlight;"; in claim 9, at line 3, after the term "electricity;"; in claim 18, at line 3, after the term "sun;"; in claim 21, at line 4, after the term "panel;"; in claim 25, at line 5, after the term "panel;"; and in claim 26, at line 4, after the term "surface;".

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 9-17, 20, and 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, at line 8, the term "greater quantity of electricity" is relative, but the baseline for comparison is not given. Accordingly, the term is subjective. The same applies to dependent claims 10-17. It is suggested that the term "whereby a greater quantity of electricity is obtained" be deleted from said line 8.

In claim 10, at line 3, the term "more sunlight" is relative, but the baseline for comparison is not given. Accordingly, the term is subjective. It is suggested that the term "to concentrate more sunlight on the surface" be deleted from said line 3.

Claim 12 is indefinite because "the passageway" at line 1 lacks positive antecedent support in claim 9. The same applies to dependent claim 13. It is suggested that claim 12 be amended so as to depend from claim 11.

In each of claims 20 and 28, the term "low vertical profile" is subjective. It is not clear how low the vertical profile must be in order to be considered to have a "low vertical profile".

In claim 26, at line 3, the term "greater amount of sunlight" is relative, but the baseline for comparison is not given. Accordingly, the term is subjective. The same applies to dependent claim 27. It is suggested that the term "to thereby concentrate a greater amount of sunlight on the surface" be deleted from lines 3-4 of claim 26.

Claim Rejections - 35 USC § 102

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7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5, 6, 8, 18, 20-23, 25, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Murphy (U.S. Patent 4,235,221).

With respect to claims 1, 2, 18, 21, 25, and 29, Murphy teaches a solar energy apparatus (61) comprising a flat panel converter; i.e., solar cell array (79), having a top upon which light is impinged, the solar cells converting light to electricity; and a cooling mechanism disposed next to the solar cells away from the sun and comprising fluid tubes (67) (i.e., a fluid passageway) beneath the solar cells (79) so as to cool the solar cells, i.e., to dissipate heat created at the solar cells (see Figure 5; and col. 8, line 9 through col. 9, line 46).

With respect to claim 3, the tubes (67) can be made from copper or aluminum (see col. 8, lines 23-24), i.e., thermally conductive metal material.

With respect to claim 5, there is a thermally conductive metal sheet (69) disposed above the metal tubes (67) (see Figure 5; and col. 8, lines 23-26).

With respect to claims 6, 23, and 29, there is an electrical insulation layer (78) (i.e., a dielectric layer) between the tubes (67) and the solar cell array (79), said insulation layer (78) permitting heat transfer (i.e., is thermally conducting) (see col. 8, lines 51-56; and col. 9, lines 19-26). This electrical insulation layer (78) corresponds to the bi-functional material in claim 29.

With respect to claim 8, thermoelectric elements and their associated layers (71,74,70,73) correspond to the instant support layer superimposed over the tubes (67) (see Figure 5).

Further with respect to claims 18 and 25, the solar energy apparatus (61) can be continuously directed toward the sunlight during the daytime, i.e., kept essentially perpendicular to the rays of sun by adjusting position along horizontal axle (55), as well as rotating platform (37), i.e., multiple axes tracking (see col. 7, lines 22-42; and Figures 1, 3, and 4).

With respect to claims 20 and 28, the solar collector panel elements (61) which are used in Figures 1, 2, 3, 4, and 10, have "a low vertical profile" to the best that this term is understood (see also col. 2, lines 49-52; and in particular, Figure 1).

With respect to claim 22, the heated fluid, e.g. heated water, heated as a result of passing through the tubes (67) of the solar energy apparatus (61), can be used to due work (see col. 4, lines 29-51; and col. 15, line 8 through col. 17, line 28).

Since Murphy teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

9. Claims 9, 10, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Dodge (U.S. Patent 4,316,448).

Dodge teaches a solar energy converter system comprising flat plate solar panel (14), and solar concentrator (12) extending angularly skyward away from a peripheral location adjacent to the surface of the solar panel (14) (see Figures 1, 2, 5 and 6; and col. 2, line 25 through col. 4, line 3). Looking at Dodge's Figure 2, rays of sunlight offset

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from but adjacent to the surface of panel (14) will be deflected by the concentrator (12) against the surface of the panel (14)

With respect to claim 9, as seen in Figures 1 and 6, the concentrator (12) on the sides of a panel (14) are upwardly diverging angular mirrors (reflectors) at the peripheral surface of said panel (14) (see also col. 2, lines 25-47).

With respect to claim 15, there is a support backing (16) upon which the panel (14) is disposed (see Figure 2; and col. 2, lines 25-31).

Since Dodge teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-8, 18, 20-23, 25, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy (U.S. Patent 4,235,221) in view of Takaoka (U.S. Patent 4,493,940) and Kravitz (U.S. Patent 4,106,952).

With respect to claims 1, 2, 18, 21, 25, and 29, Murphy teaches a solar energy apparatus (61) comprising a flat panel converter, i.e., solar cell array (79), having a top upon which light is impinged, the solar cells converting light to electricity; and a cooling mechanism disposed next to the solar cells away from the sun and comprising fluid tubes (67) (i.e., a fluid passageway) beneath the solar cells (79) so as to cool the solar

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cells, i.e., to dissipate heat created at the solar cells (see Figure 5; and col. 8, line 9 through col. 9, line 46).

With respect to claim 3, the tubes (67) can be made from copper or aluminum (see col. 8, lines 23-24), i.e., thermally conductive metal material.

With respect to claim 5, there is a thermally conductive metal sheet (69) disposed above the metal tubes (67) (see Figure 5; and col. 8, lines 23-26).

With respect to claims 6, 23, and 29, there is an electrical insulation layer (78) (i.e., a dielectric layer) between the tubes (67) and the solar cell array (79), said insulation layer (78) permitting heat transfer (i.e., is thermally conducting) (see col. 8, lines 51-56; and col. 9, lines 19-26). This electrical insulation layer (78) corresponds to the bi-functional material in claim 29.

With respect to claim 8, thermoelectric elements and their associated layers (71,74,70,73) correspond to the instant support layer superimposed over the tubes (67) (see Figure 5).

Further with respect to claims 18 and 25, the solar energy apparatus (61) can be continuously directed toward the sunlight during the daytime, i.e., kept essentially perpendicular to the rays of sun by adjusting position along horizontal axle (55), as well as rotating platform (37), i.e., multiple axes tracking (see col. 7, lines 22-42; and Figures 1, 3, and 4).

With respect to claims 20 and 28, the solar collector panel elements (61) which are used in Figures 1, 2, 3, 4, and 10, have "a low vertical profile" to the best that this term is understood (see also col. 2, lines 49-52; and in particular, Figure 1).

With respect to claim 22, the heated fluid, e.g. heated water, heated as a result of passing through the tubes (67) of the solar energy apparatus (61), can be used to do work (see col. 4, lines 29-51; and col. 15, line 8 through col. 17, line 28).

Murphy teaches the limitations of the instant claims other than the differences which are discussed below.

Murphy does not teach that its thermal collecting tubes (67) are serpentine (as in instant claim 4); that there is thermal insulation surrounding at least part of said collecting tubes (67) (as in instant claim 7); and that its solar cell array (79) is in a hermetically sealed, evacuated environment (as in instant claim 30). However, these features are conventional in the art. Takaoka teaches a zigzag, i.e., serpentine heat collecting tube (7) beneath its solar cells (9), and teaches thermal insulation (5) surrounding at least part of said collecting tube (7) (see col. 2, lines 32-65; and Figures 3 and 4). Additionally, Kravitz teaches serpentine pipe (17) beneath its photoelectric cells (7); thermal insulation (23) surrounding at least part of said serpentine pipe (17); and hermetically sealing its device in an enclosure that is evacuated so as to greatly decrease heat transfer by conductivity or convection from the photoelectric cells (7) to the top glass plate (5) (see col. 2, line 6 through col. 3, line 37; and Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Murphy's thermal collecting tubes (67) in a serpentine shape, to have surrounded at least part of Murphy's collecting tubes (67) with thermal insulation, and to have hermetically sealed Murphy's solar cell array (79) in an evacuated environment because these features are conventional in the art, as shown by Takaoka and Kravitz.

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The use of hermetic sealing and an evacuated environment for the solar cell array (79) would provide the advantage of greatly decreased heat transfer by conductivity or convection from the photoelectric cells (7) to the glass plate, as taught by Kravitz.

12. Claims 1-3, 5, 6, 8-11, 13-16, 18-26, 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy (U.S. Patent 4,235,221) in view of Dodge (U.S. Patent 4,316,448).

With respect to claims 1, 2, 9, 11, 18, 21, 25, and 29, Murphy teaches a solar energy apparatus (61) comprising a flat panel converter, i.e., solar cell array (79), having a top upon which light is impinged, the solar cells converting light to electricity; and a cooling mechanism disposed next to the solar cells away from the sun and comprising fluid tubes (67) (i.e., a fluid passageway) beneath the solar cells (79) so as to cool the solar cells, i.e., to dissipate heat created at the solar cells (see Figure 5; and col. 8, line 9 through col. 9, line 46).

With respect to claim 3, the tubes (67) can be made from copper or aluminum (see col. 8, lines 23-24), i.e., thermally conductive metal material.

With respect to claims 5 and 13, there is a thermally conductive metal sheet (69) disposed above the metal tubes (67) (see Figure 5; and col. 8, lines 23-26).

With respect to claims 6, 14, 23, and 29, there is an electrical insulation layer (78) (i.e., a dielectric layer) between the tubes (67) and the solar cell array (79), said insulation layer (78) permitting heat transfer (i.e., is thermally conducting) (see col. 8, lines 51-56; and col. 9, lines 19-26). This electrical insulation layer (78) corresponds to the bi-functional material in claim 29.

With respect to claims 8 and 15, thermoelectric elements and their associated layers (71,74,70,73) correspond to the instant support layer superimposed over the tubes (67) (see Figure 5).

Further with respect to claims 16, 18, and 25, the solar energy apparatus (61) can be continuously directed toward the sunlight during the daytime, i.e., kept essentially perpendicular to the rays of sun by adjusting position along horizontal axle (55), as well as rotating platform (37), i.e., multiple axes tracking (see col. 7, lines 22-42; and Figures 1, 3, and 4).

With respect to claims 20 and 28, the solar collector panel elements (61) which are used in Figures 1, 2, 3, 4, and 10, have "a low vertical profile" to the best that this term is understood (see also col. 2, lines 49-52; and in particular, Figure 1).

With respect to claim 22, the heated fluid, e.g. heated water, heated as a result of passing through the tubes (67) of the solar energy apparatus (61), can be used to do work (see col. 4, lines 29-51; and col. 15, line 8 through col. 17, line 28).

Murphy teaches the limitations of the instant claims other than the difference which is discussed below.

With respect to claim 9 and its dependent claims, and with respect to claims 19, 24, 26, and 31, Murphy lacks the instant sunlight concentrator, wherein the sunlight concentrator comprises at least two opposed upwardly diverging angular mirrors disposed peripherally to the surface of Murphy's apparatus. Dodge teaches a solar energy converter system comprising flat plate solar panel (14), and solar concentrator (12) extending angularly skyward away from a peripheral location adjacent to the

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surface of the solar panel (14) (see Figures 1, 2, 5 and 6; and col. 2, line 25 through col. 4, line 3). Looking at Dodge's Figure 2, rays of sunlight offset from but adjacent to the surface of panel (14) will be deflected by the concentrator (12) against the surface of the panel (14). Dodge's solar energy concentrator system provides the advantage of increasing the intensity of solar energy on collecting surfaces (see col. 1, lines 6-11). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Dodge's concentrator at the periphery of Murphy's solar energy apparatus (61) so as to increase the intensity of solar energy on collecting surfaces of said apparatus.

13. Claims 4, 7, 12, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy in view of Dodge as applied to claims 1-3, 5, 6, 8-11, 13-16, 18-26, 28, 29, and 31 above, and further in view of Takaoka (U.S. Patent 4,493,940) and Kravitz (U.S. Patent 4,106,952).

Murphy in view of Dodge, as relied upon for the reasons recited above, teaches the limitations of the instant claims 4, 7, 12, and 30, the differences being that Murphy does not specifically teach that its thermal collecting tubes (67) are serpentine (as in instant claim 4); that there is thermal insulation surrounding at least part of said collecting tubes (67) (as in instant claim 7); and that its solar cell array (79) is in a hermetically sealed, evacuated environment (as in instant claim 30). However, these features are conventional in the art. Takaoka teaches a zigzag, i.e., serpentine heat collecting tube (7) beneath its solar cells (9), and teaches thermal insulation (5) surrounding at least part of said collecting tube (7) (see col. 2, lines 32-65; and Figures

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3 and 4). Additionally, Kravitz teaches serpentine pipe (17) beneath its photoelectric cells (7); thermal insulation (23) surrounding at least part of said serpentine pipe (17); and hermetically sealing its device in an enclosure that is evacuated so as to greatly decrease heat transfer by conductivity or convection from the photoelectric cells (7) to the top glass plate (5) (see col. 2, line 6 through col. 3, line 37; and Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Murphy's thermal collecting tubes (67) in a serpentine shape, to have surrounded at least part of Murphy's collecting tubes (67) with thermal insulation, and to have hermetically sealed Murphy's solar cell array (79) in an evacuated environment because these features are conventional in the art, as shown by Takaoka and Kravitz. The use of hermitic sealing and an evacuated environment for the solar cell array (79) would provide the advantage of greatly decreased heat transfer by conductivity or convection from the photoelectric cells (7) to the glass plate, as taught by Kravitz.

14. Claims 17 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy in view of Dodge as applied to claims 1-3, 5, 6, 8-11, 13-16, 18-26, 28, 29, and 31 above, and further in view of Feustel et al (DE 3005876 A1).

Murphy in view of Dodge, as relied upon for the reasons recited above, teaches the limitations of claims 17 and 27, the difference being that Murphy in view of Dodge does not specifically teach inverting the solar energy apparatus during times of low and no sunlight to protect its surface, as well as the surface of the solar concentrators. Feustel et al teaches solar cells mounted on a frame, wherein the structure made be positioned facing downward to avoid dust accumulation, dew at night, or water and

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snow accumulations (see the attached English abstract; and the entire Feustel et al German document). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provided the solar energy apparatus of Murphy in view of Dodge so that it could be positioned facing downward so as to avoid dust accumulation, dew at night, or water and snow accumulations, as taught by Feustel et al.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,498,290, US 6,696,637, and US 2004/0216734 are hereby made of record.

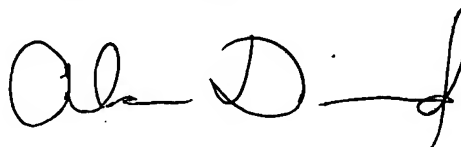
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
May 2, 2005

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.